

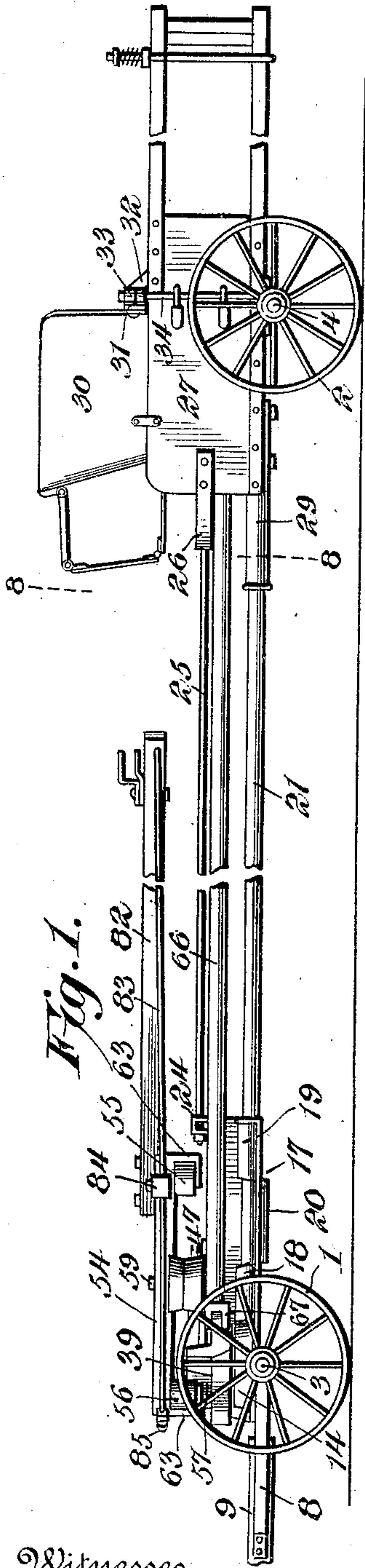
No. 841,735.

PATENTED JAN. 22, 1907.

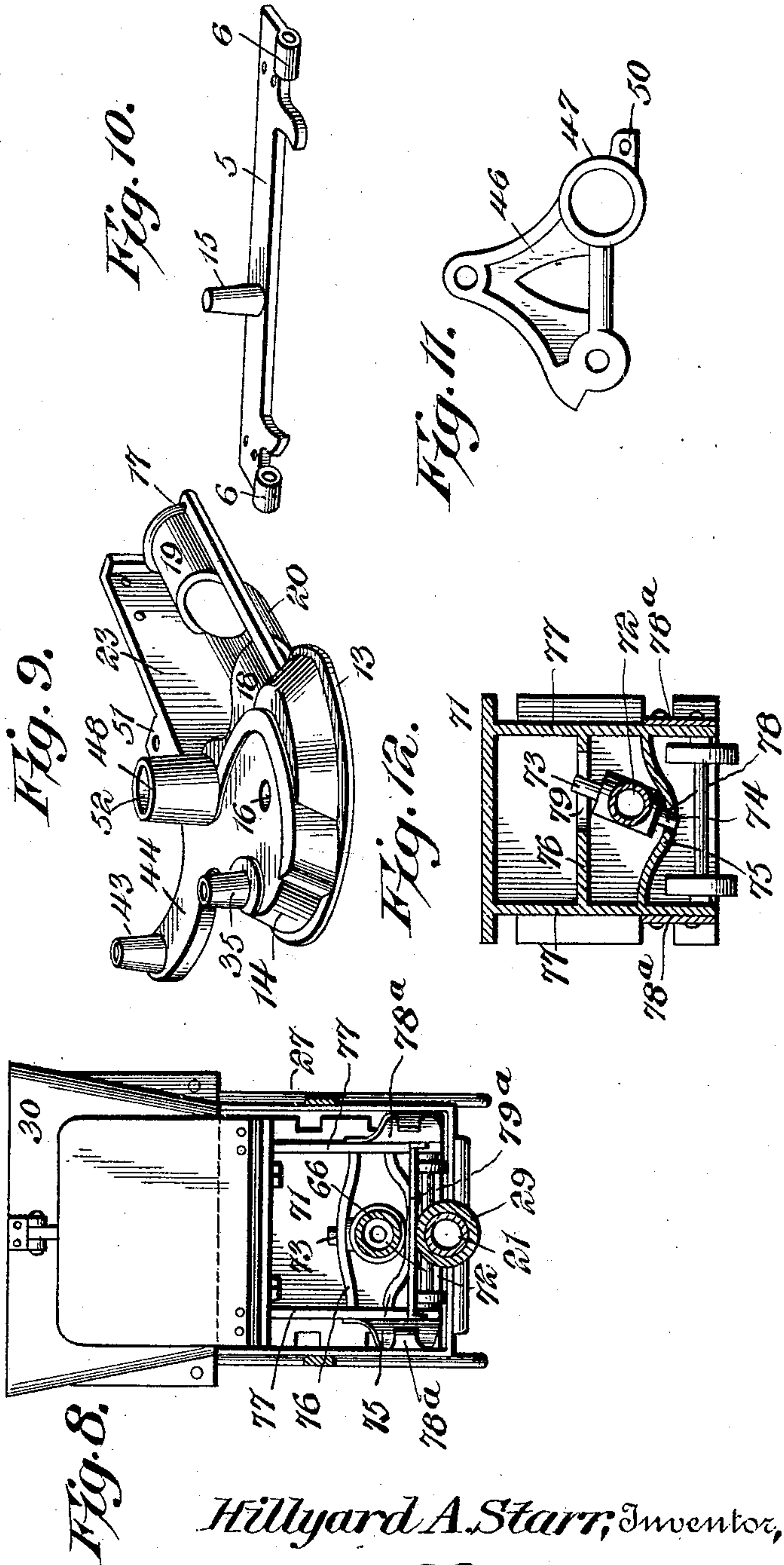
H. A. STARR.
BALING PRESS.

APPLICATION FILED OCT. 13, 1904.

4 SHEETS—SHEET 1.



Witnesses
Howard W. Orr.
Lauris G. Julihn



Hillyard A. Starr, Inventor,

By *E. G. Siggers*
Attorney

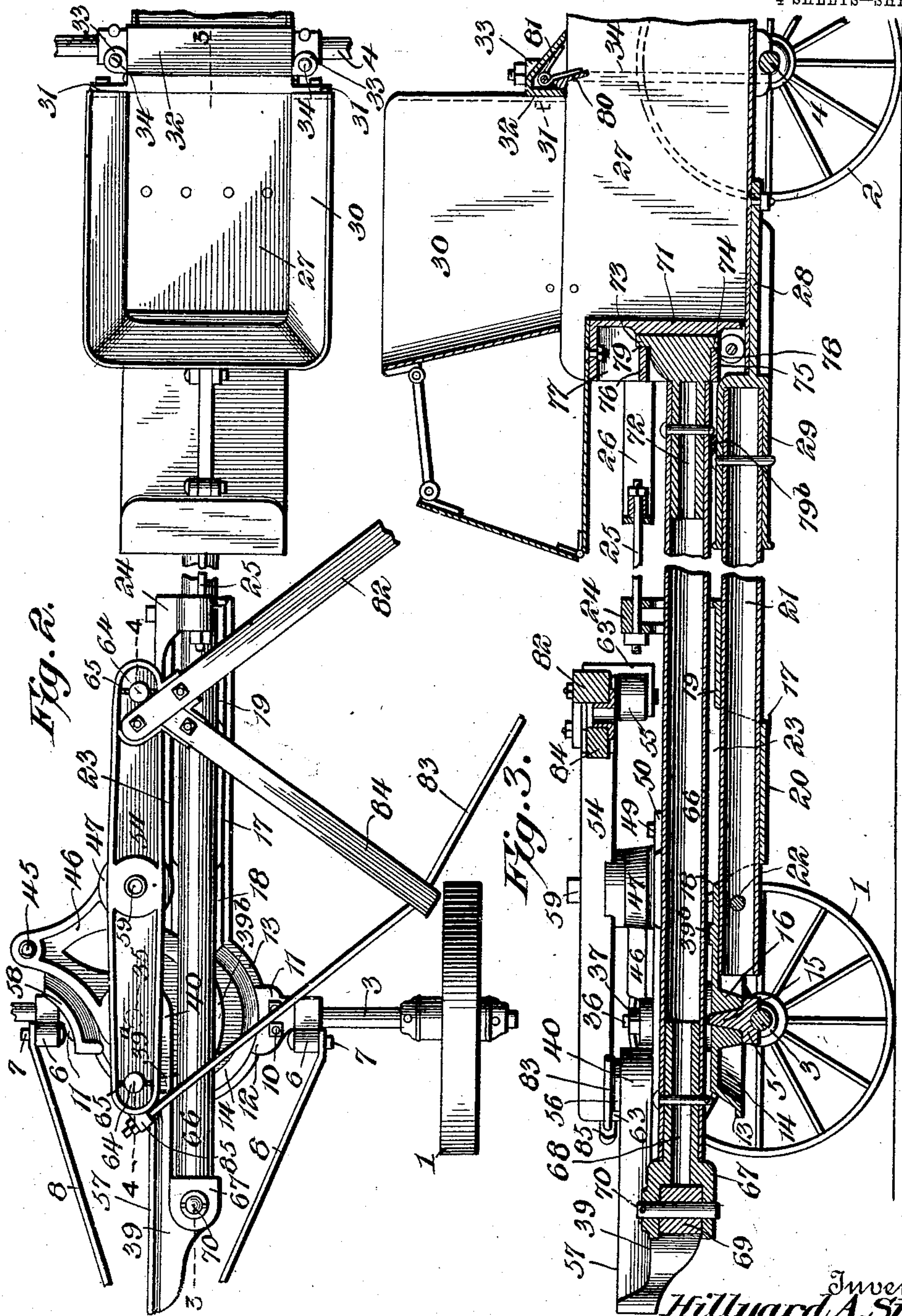
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Witnesses
Howard W. Orr
Louis G. Juhn

Inventor,
Hillyard A. Starr
By *E. J. Siggers*
Attorney

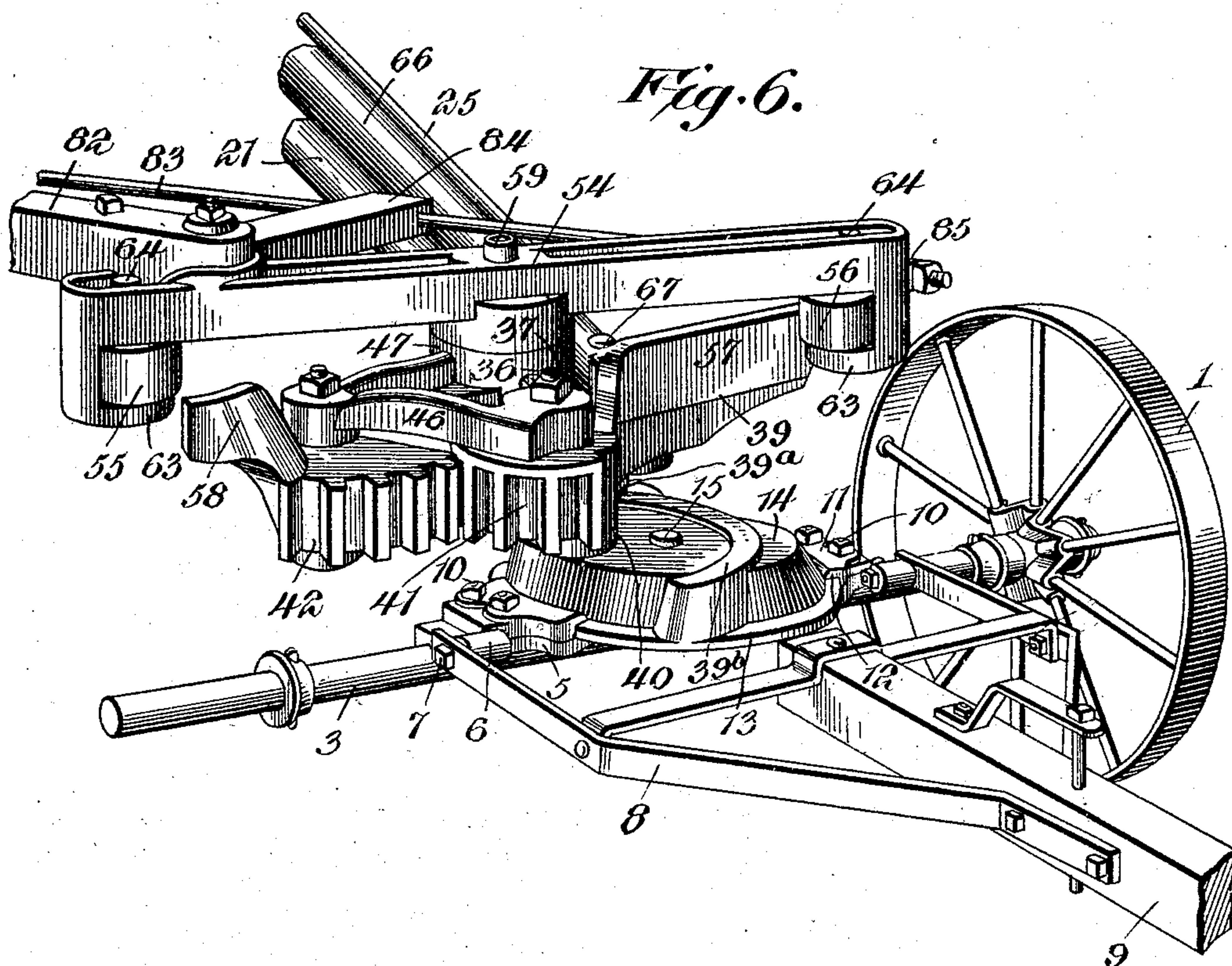
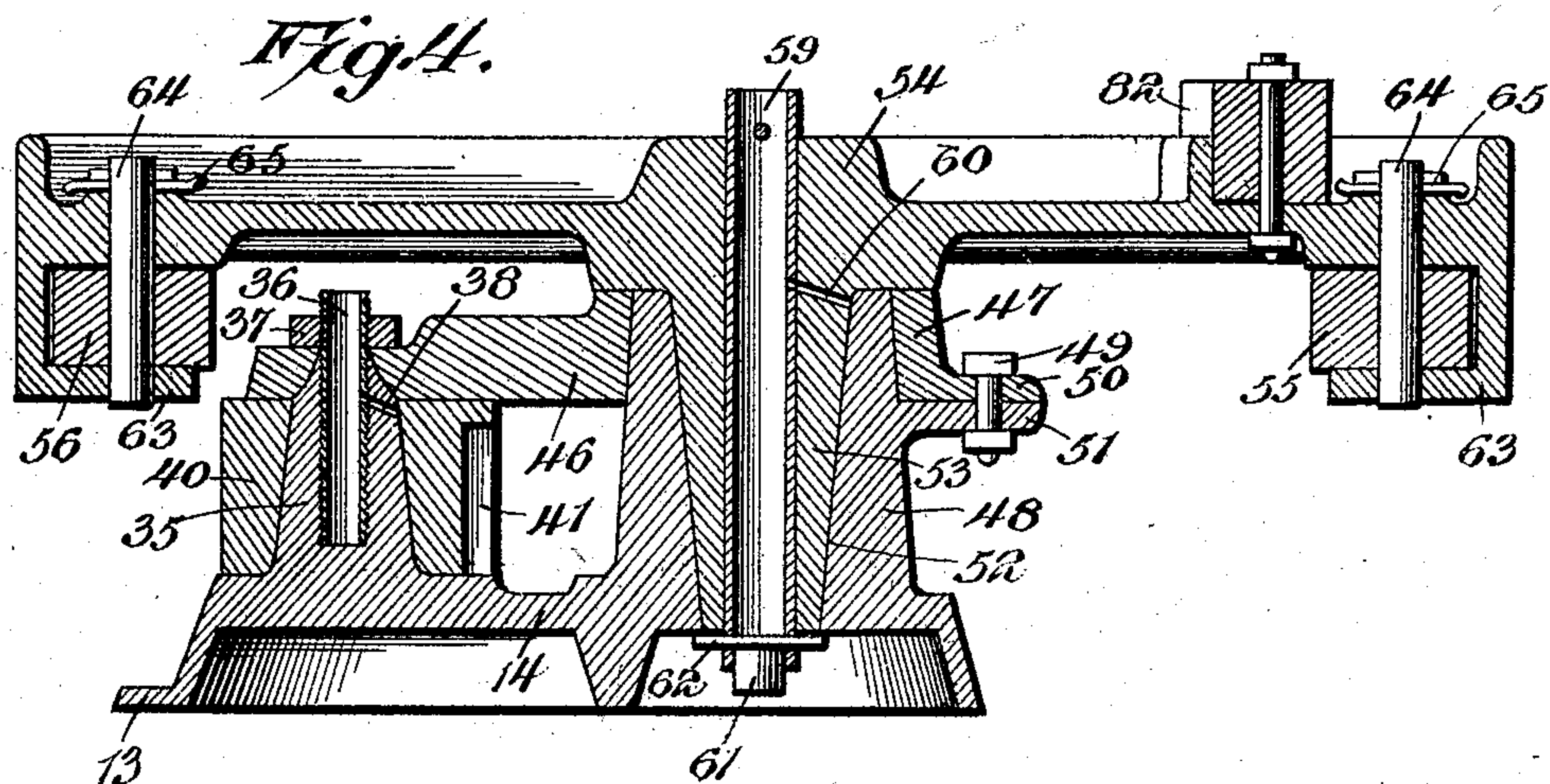
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4 SHEETS—SHEET 3.



Hillyard A. Starr, Inventor,

Witnesses
Howard D. Orr.
Louis G. Jellison

By *E. G. Siggers*
Attorney

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4 SHEETS—SHEET 4.

Fig. 5.

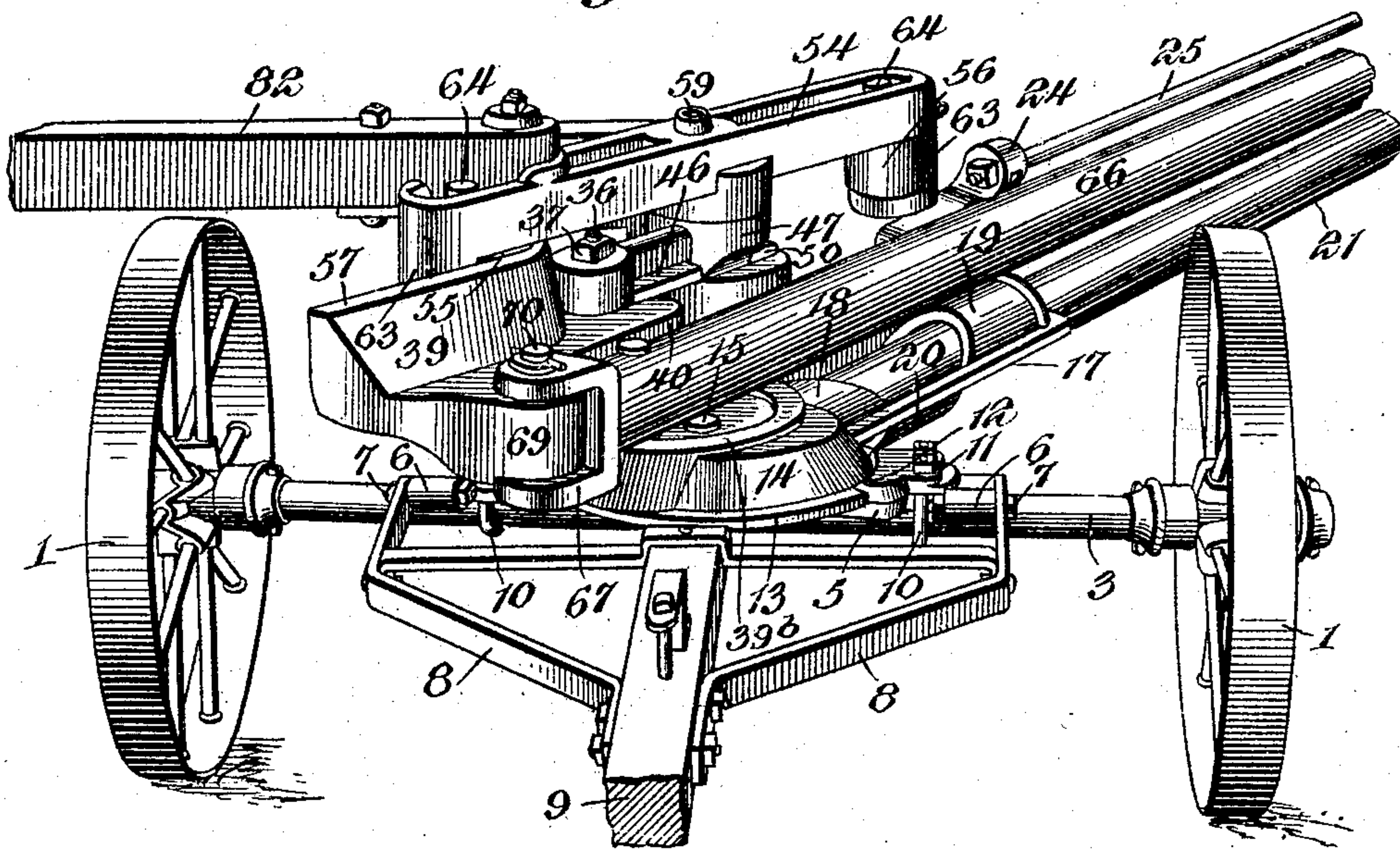
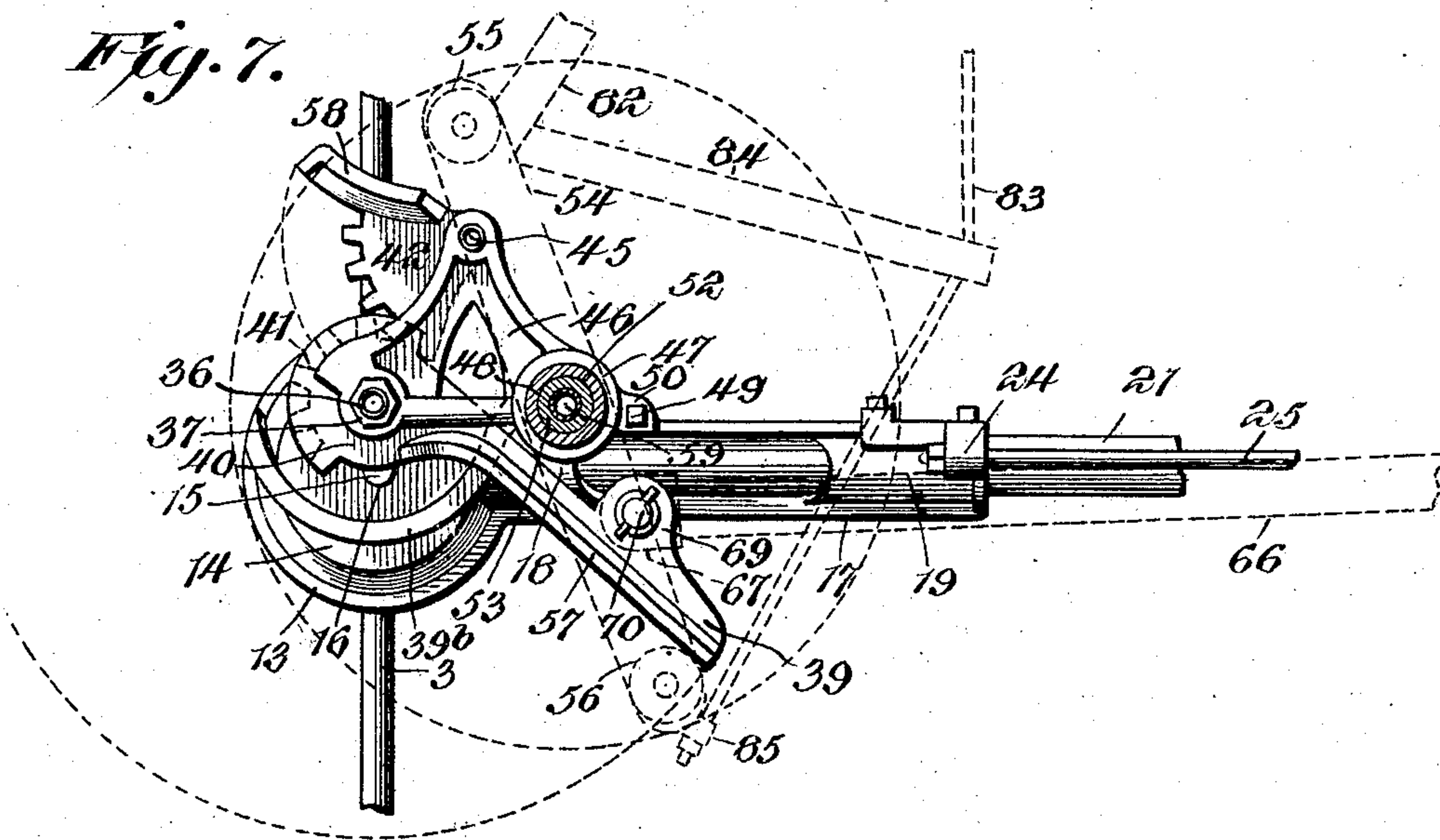


Fig. 7.



Harvard A. Starr, Inventor,

By

E. J. Siger

Attorney

Witnesses
Howard W. Ott
Louis E. Julihn

UNITED STATES PATENT OFFICE.

HILLYARD A. STARR, OF EAST CHATTANOOGA, TENNESSEE, ASSIGNOR
TO CHATTANOOGA IMPLEMENT AND MANUFACTURING COMPANY,
OF EAST CHATTANOOGA, TENNESSEE.

BALING-PRESS.

No. 841,735.

Specification of Letters Patent.

Patented Jan. 22, 1907.

Application filed October 13, 1904. Serial No. 228,298.

To all whom it may concern:

Be it known that I, HILLYARD A. STARR, a citizen of the United States, residing at East Chattanooga, in the county of Hamilton and State of Tennessee, have invented a new and useful Baling-Press, of which the following is a specification.

This invention relates to a novel baling-press, and has for its primary object to produce a simple, durable, efficient, and inexpensive all-metal press the plunger and power mechanism of which may be constructed of cast members so combined as to eliminate the necessity for machined bearings or joints.

Another object is to so construct the power mechanism that a compound leverage will be secured to enable bales averaging a hundred pounds to be produced by the application of a single horse-power of motive force.

Another object is to provide for the positive retraction of the plunger without the aid of springs or other reactive mechanism and with sufficient promptness to give ample time for the feeding of material to the press without interrupting the movement of the sweep.

A still further object of the invention is to provide the power mechanism with chilled self-oiling bearings.

Another object is to improve the construction of the plunger and the manner of its connection with the plunger-rod or pitman to facilitate the connection and disconnection of these elements; and a still further object subordinate to those enumerated is to improve the construction and mounting of the tucker or folder.

Still other objects of the invention will appear as the succeeding description of the illustrated embodiment of the invention is developed.

In the accompanying drawings, Figure 1 is a side elevation of the press and its power mechanism. Fig. 2 is a plan view, on a somewhat enlarged scale, of the subject-matter of Fig. 1, certain of the parts being broken away. Fig. 3 is a longitudinal section on the line 3 3 of Fig. 2. Fig. 4 is an enlarged section on the line 4 4 of Fig. 2. Fig. 5 is a perspective view of the power mechanism with parts in the positions they assume at the be-

ginning of the plunger-stroke. Fig. 6 is a similar view with the parts in the positions they assume when the plunger-stroke is nearing completion. Fig. 7 is a sectional plan view with the parts positioned as shown in Fig. 6, the sweep-head being indicated in dotted lines. Fig. 8 is an enlarged section on the line 8 8 of Fig. 1. Fig. 9 is a detail perspective view of the base member of the power mechanism. Fig. 10 is a similar view of the sand-bolster. Fig. 11 is a detail view of the cap-plate, and Fig. 12 is a detail sectional view showing the connection between the plunger and the pitman.

The entire press structure is portably mounted upon front and rear wheels 1 and 2, which rotate loosely at the outer ends of front and rear axles 3 and 4, located below the power mechanism and the press-box, respectively, as shown in Fig. 3. To the front axle 3 is secured a bolster 5, having the form of a cast plate, as shown in Fig. 10, provided at the opposite ends of its front edge with eyes 6 for the reception of the bolts 7, which serve to connect the hounds 8 of the tongue 9 to the bolster. The bolster 5 is secured to the axle 3 by U-shaped clips 10, which also serve as securing means for a pair of keepers 11, rigidly retained upon the bolster adjacent to its opposite end and provided with arcuate flanges 12, which overhang the peripheral base-flange 13 of the base-plate or supporting-casting 14 of the power mechanism.

In addition to its function as the main supporting member of the power mechanism the plate 14 constitutes a fifth-wheel, since the axle is designed to swing from an axis concentric with the flange 13, upon which the keepers 11 slide. This pivotal connection between the main casting 14 and the bolster is effected by forming the bolster 5 with a chilled stud 15, preferably tapered, as shown, and extended into a corresponding socket 16, formed in the plate or casting 14. (See Fig. 3.)

In rear of the substantially circular front portion of the plate 14, the upper surface of which is elevated above the flange 13, is formed a reach-socket 17, comprising a pair of upper segments 18 and 19, spaced apart, as shown in Fig. 9, and an intermediate lower segment 20. In this socket is passed the front end of the tubular reach 21, which is se-

cured to the casting 14 in any suitable manner—as, for instance, by a key 22, as shown in Fig. 3. At one side of the reach-socket 17 the casting 14 is formed with a longitudinally-disposed vertical flange 23, to the rear end of which is bolted the stay-rod bracket 24, which facilitates the connection of the stay-rod 25 to the main casting. The rear end of the stay-rod 25 is connected by a strap 26 to the press-box 27, the front end of which is bolted or otherwise secured to the reach-casting 28, (see Fig. 3,) formed with a reach-socket 29, into which the rear end of the reach 21 is extended and keyed, as shown. Above the press-box 27 is mounted, as usual, a hopper 30, bolted at its rear edge to a pair of lugs 31, located at the opposite ends of a hollow transverse frame-bar 32, extended across the press-box immediately in rear of the hopper and provided with ears 33 for the attachment of a pair of hook-bolts 34, disposed vertically at opposite sides of the press-box and hooked under the rear axle 4 to retain the latter in place.

The construction thus far described constitutes the framing or supporting structure of the press, and I shall now proceed to describe the power mechanism and the arrangement of the plunger operated thereby to press the material fed into the press-box from the hopper 30.

At a point eccentric to the socket 16 the main casting 14 is provided with an integral chilled stud 35 of tapered form, at the axis of which is retained an oil-tube 36, extended above the stud and externally threaded for the reception of a nut 37. The oil-tube 36 is preferably rigidly secured to the stud—as, for instance, by utilizing the tube as a core, around which the stud is cast in the manufacture of the plate 14. The tube 36 is designed to contain oil and waste and is in communication with an oil-duct 38, leading to the exterior of the stud adjacent to its upper end and designed to furnish a constant supply of oil to the bearing, of which the stud constitutes one member. The stud 35 constitutes a bearing for a plunger operating or driving arm 39, having at one end a hub 40, which encircles the stud 35, and is provided at the side thereof opposite the arm with a toothed segment 41, meshing with a segmental toothed retractor 42 of somewhat greater radius than the toothed segment of the arm 39.

The segmental retractor 42 oscillates upon a tapered chilled stud 43, similar to the stud 35 and integral with the outer end of an arm 44, constituting a lateral extension of the main casting 14, as shown in Fig. 9. The stud 43, like the stud 35, is provided with an oil-tube 45, designed to constantly supply oil to the bearing of the retractor 42. The plunger-operating arm 39 and the retractor 42 are retained upon their studs 35 and 43 by what may be termed a "cap-plate" 46, apertured for the reception of the upper ends of

the studs and also provided with a considerably larger aperture 47 for the reception of the upper end of a tapered sweep-socket 48, integral with and extended vertically from the plate 14 at a point in rear of the stud 35. (See Fig. 4.) The cap-plate 46 is retained in place by the nut 37, screwed upon the oil-tube 36, and is further secured by a bolt 49, passed through a bolt-flange 50, formed on the cap-plate, and passed through a bolt-flange 51, integral with the socket 48 and the flange 23 of the main casting. (See Figs. 4 and 9.) The bore 52 of the socket member 48 is downwardly tapered and extends entirely through the member, as shown in Fig. 4. Into this tapered bore extends a similarly-tapered bearing member or stud 53, depending from and integral with the sweep 54, designed to rotate with the member 53 as an axis for the purpose of presenting the sweep-rollers 55 and 56, located at the opposite ends of the sweep, to the roller-flanges 57 and 58, formed, respectively, on the plunger-operating arm 39 and the retractor 42. (See Fig. 6.)

Extended entirely through the sweep and its bearing member 53 at the axis of the latter is an oil-tube 59, communicating with the upper end of the bearing through a duct 60 and having its lower end closed by a plug 61, retained in place by a keeper 62, which latter also serves to prevent the rising of the bearing member 53 in its socket.

Since, as heretofore stated, one of the primary objects of the invention is to avoid machine-work in the manufacture and fitting of the various elements of the power mechanism, the usual method of drilling openings in the sweep and fitting stud-shafts therein for the rollers is not followed. On the contrary, the rollers are interposed between the under side of the sweep and angular drop-flanges 63, which constitute bottom bearings for the rollers. Each roller is mounted on a short shaft 64, extending through the sweep and the flange 63 and held from dropping out by a key 65. By means of this construction the shaft-openings instead of being machined are formed by cores in the casting of the sweep, the provision of both upper and lower bearings for the rollers causing the latter to run true and eliminating tortuous strains on the roller-shaft.

The connection between the plunger-operating arm 39 and the tubular plunger-pitman 66 includes a bifurcated connecting member 67, having a shank 68, secured within the front end of the pitman. The member 67 is made to span a lug 69, projecting rearwardly from the arm 39 at a point somewhat removed from its outer end and pivotally connected to the member by a pin 70. (See Figs. 3 and 7.) The opposite end of the pitman 66 is connected to the roller-supported plunger 71 by a connecting member 72, similar to the connecting member 68, except

that instead of being bifurcated it is provided with upper and lower cylindrical lugs 73 and 74, extended through horizontal plates 75 and 76, secured between the side walls 77 of the plunger. As shown in Fig. 12, the plate 75 is provided with an opening 78 for the lug 74, while the upper plate is provided with a slot 79 for the lug 73. By this construction a pivotal connection is effected between the pitman and the plunger and said elements are made readily detachable by reason of the fact that the pitman may be swung for the purpose of moving the lug 73 laterally until it is withdrawn from the slot, when, as will be obvious, the pitman and plunger may be readily disconnected.

To prevent lateral movement of the plunger during its stroke, it is provided with a pair of spring-plates 78^a, extending forwardly from the side walls 77 and bearing against the side walls of the press-box 27. (See Fig. 8.) The plates 78^a are held apart by a strut 79^a, constituting a brace for the spring-plates and also serving as a rest for the plunger when the latter is withdrawn from the baling-chamber, since, as will be seen by reference to Fig. 8, the strut 79^a is disposed in a plane immediately above the socket 29 of the reach-casting 28, upon which it is adapted to rest.

The hollow frame-bar 32 in addition to its function as a rigid part of the frame structure of the press also constitutes a housing for a tucker or folder 80, having the form of a plate pivoted at its upper edge within the bar 32 and yieldingly urged by a spring 81 to the position shown in Fig. 3. The bar 32 serves to protect the folder 80 in a manner to effectually prevent the breaking or clogging thereof, and the arrangement of the folder positively prevents the plunger-head from becoming stuck in the usual manner.

Power is applied to the head 54 by means of a sweep 82, bolted to the head, as shown in Fig. 2, and braced by a sweep-brace 83 and an equalizing-brace 84, the former being extended through an eye 85, cast at one extremity of the head, as shown in Fig. 2. To prevent sagging of the arm 39 and the outer end of the pitman connected thereto, said arm is provided with a shoe 39^a, disposed to travel upon a raised arcuate track 39^b on the main casting 14, as shown in Fig. 6.

Briefly, the operation of the press is as follows: Assuming the parts to be in the positions shown in Figs. 2, 3, and 5 and the press-box to be supplied with a charge of hay, the rotation of the head 54 will present one of its rollers to the roller-flange 57 of the plunger-operating arm 39. As the head continues to rotate the arm 39 is forced to swing, carrying with it the pitman and the plunger. The arm 39 and the pitman constitute a toggle toward the joint of which the roller of the head advances during the inward movement

of the parts. As the movement continues, however, the roller reaches the joint and passes on beyond the same, this shifting of the point of application of the power serving to greatly increase the leverage exerted by the power mechanism to compensate for the increasing resistance opposed to the inward movement of the plunger by the material in the press-box. The parts will finally assume the positions shown in Fig. 7, and slight continued movement will cause one of the rollers on the head to move out of engagement with the arm 39, and immediately after this release is effected the other roller will come in contact with the roller-flange 58 on the retractor 42. The retractor will now be swung on its pivot in an obvious manner, and as it is geared to the hub of the plunger-operating arm 39 the latter will be swung back to its normal position, where it will subsequently be engaged by that roller which has just operated the retractor, and a repetition of the described operation will take place. It is to be noted that two plunger-strokes are effected for each complete rotation of the head, since it will be obvious that each of the rollers first operates the retractor to position the plunger-operating arm and then swings the arm to operate the plunger, a repetition of these operations being thereafter effected by the other roller as soon as the first-named roller has moved away from the arm 39. It is also to be noted that by reason of the comparatively great radius of the retractor 42 relative to the radius of the toothed segment 41 the retraction of the plunger will be effected with great promptness, thus giving the operator ample time for the feeding of the press.

It is thought that from the foregoing the construction, mode of operation, and many advantages of my baling-press will be clearly comprehended; but while the present embodiment of the invention is thought at this time to be preferable I desire to expressly reserve the right to effect such changes, modifications, and variations of the illustrated structure as may come fairly within the scope of the protection prayed.

What I claim is—

1. In a baling-press, the combination with a frame structure including a press-box, a supporting-casting, and an intermediate reach, said supporting-casting having a trunco-conical socket formed therein, of front and rear trucks, the front truck including an axle, a bolster secured thereto and a tapered stud extended from the bolster and rotating within the trunco-conical socket of the supporting-casting, a plunger in the press-box, and plunger-operating mechanism mounted on the supporting-casting.

2. In a baling-press, the combination with a frame structure including a press-box, a supporting member, and an intermediate

reach, said supporting member being formed with a socket and a stud, of a front truck having a bearing member extended into the socket, a driving-arm mounted on the stud, a rotary head cooperating with the driving-arm, a pitman connected to said arm, and a plunger located in the press-box and operated by the pitman.

3. In a baling-press, the combination with a frame structure including a press-box, a supporting member, and an intermediate reach, said supporting member being formed with a stud and a socket member both projecting upwardly therefrom, of a driving-arm mounted on the stud, a rotary head cooperating with the driving-arm and provided with a bearing member extended into the socket member, a pitman connected to the driving-arm, and a plunger operated by the pitman.

4. In a baling-press, the combination with a frame structure including a press-box, a supporting member, and an intermediate reach, said supporting member being formed with a socket, a stud and a vertically-disposed socket member, of a front truck having a bearing member extended into the socket to effect a swivel connection between the truck and the supporting member, a driving-arm mounted to swing from the stud, a double-ended rotary head arranged to operate the driving-arm and having a depending bearing member engaging the socket member, a pitman connected with the driving-arm, and a plunger operated by the pitman.

5. In a baling-press, the combination with a press-box, a supporting member, and an intermediate reach, said supporting member being provided with a stud and a socket member, of a driving-arm mounted to swing from the stud, a cap-plate disposed above the driving-arm and connected to the stud and socket member respectively, a head arranged to operate the driving-arm and having a bearing in the socket member, a pitman connected to the driving-arm, and a plunger operated by the pitman.

6. In a baling-press, the combination with a press-box, a supporting member, and an intermediate reach, said supporting member having a pair of vertical studs, of a driving-arm mounted on one stud, a retractor mounted on one stud and geared to the driving-arm, a cap-plate connected to the upper ends of the studs to retain the driving-arm and retractor, a rotary head arranged to move the driving-arm and retractor in opposite directions, a pitman connected to the driving-arm, and a plunger operated by the pitman.

7. In a baling-press, the combination with a press-box, a reach extending therefrom, and a supporting member at the front end of the reach, of a detachable cap-plate located above the supporting member, an oscillatory driving-arm and an oscillatory retractor in-

terposed between the cap-plate and the supporting member and geared together, a double-ended rotary head located above the cap-plate and arranged to engage and operate the driving-arm and retractor, a plunger, and a pitman connecting the driving-arm and plunger.

8. In a baling-press, the combination with a press-box and a supporting member having a reach-socket at its rear end, of a reach extended from the press-box and having its front end retained in the reach-socket, a truck carrying the supporting member and having swiveled connection therewith at a point in advance of the reach, a driving-arm and a retractor geared together and mounted on the supporting member in advance of the reach, a rotary head arranged to engage and operate the driving-arm and retractor, and a plunger operatively connected to the driving-arm.

9. In a baling-press, the combination with a press-box, a supporting member, and an intermediate reach, said supporting member being provided with a socket member, of an oscillatory driving-arm and an oscillatory retractor geared thereto and mounted on the supporting member, a cap-plate disposed above the driving-arm and retractor and connected to the socket member, a rotary head having a bearing in the socket member and arranged to engage and operate the driving-arm and retractor in succession, a pitman connected to the driving-arm, and a plunger operated by the pitman.

10. In a baling-press, the combination with a press-box, a supporting member, and an intermediate reach, said supporting member being provided with a pair of studs and with a socket member, of a driving-arm and a retractor mounted on the studs and geared together, a cap-plate engaging the upper ends of the studs and socket member respectively, a rotary head having a depending bearing member extended into the socket member, rollers carried by the head and arranged to engage and operate the driving-arm and retractor, a pitman connected to the driving-arm, and a plunger operating the pitman.

11. In a baling-press, the combination with a press-box, a supporting member, and an intermediate reach, of an oscillatory driving-arm, an oscillatory retractor, and a rotary head, all mounted on the supporting member and cooperatively related, the connection between each of said elements and the supporting member including a tapered bearing member engaging a correspondingly-formed socket or opening, a pitman connected to the driving-arm, and a plunger operated by the pitman.

12. In a baling-press, the combination with a press-box, a supporting member, and an intermediate reach, of a plunger in the press-box and plunger-operating mechanism

mounted on the supporting member and including a driving-arm, a retractor, and a head, each of said elements having a bearing including a tapered stud formed with an axial oil-chamber and having a duct leading from said chamber to the outer face of the stud at the upper end thereof.

13. In a baling-press, the combination with a press-box, a supporting member, and an intermediate reach, of a plunger in the press-box and plunger-operating mechanism mounted on the supporting member and including a driving-arm, a retractor, and a head, each of said elements having a bearing including a tapered stud, an oil-tube located axially in said stud, and a duct leading from the oil-tube to the outer surface of the stud.

14. In a baling-press, the combination with a press-box, a plunger and pitman, of an oscillatory driving-arm connected at a point intermediate of its ends to the pitman, and a head arranged to engage the driving-arm and to move along the latter to the outer end thereof, whereby the point of contact between the head and the arm moves beyond the connection between the arm and the pitman to compound the leverage.

15. The combination with a press-box, a plunger and pitman, of an oscillatory driving-arm provided with a hub at one end and having a roller-flange extending from the hub to the outer end of the arm, a connection between the driving-arm and the pitman, said connection being located at a point intermediate of the ends of the roller-flange, and a head provided with a terminal roller arranged to move along the flange and to finally pass beyond the outer end thereof as the plunger completes its stroke.

16. In a baling-press, the combination with a press-box, a plunger and pitman, of an oscillatory driving-arm having a toothed hub and a roller-flange extending from the hub to the outer end of the arm, a toothed oscillatory retractor meshing with the toothed hub of the driving-arm and having a roller-flange, a pivotal connection between the outer end of the pitman and the driving-arm at a point intermediate of the ends of the flange thereof, and a rotary double-ended head provided with terminal rollers disposed to engage the roller-flanges of the driving-arm and retractor.

17. A single-piece supporting-casting for the power mechanism of presses including the following features: to wit, a vertical socket, an arcuate flange concentric therewith at the lower edge of the casting, a pair of tapered vertical lugs and a tapered socket member extended above the main portion of the casting, said socket member having a downwardly-tapered socket, and a horizontally-disposed reach-socket extended rearwardly from the body portion of the casting.

18. In a baling-press, the combination

with a press-box and a plunger therein, of a reach extended from the press-box, a truck, a supporting-casting serving as a coupling between the truck and the reach and having swiveled connection with the truck at a point in advance of the reach, and plunger-operating mechanism mounted on the supporting-casting in advance of the reach and independently of the truck connection and having operative connection with the plunger.

19. In a baling-press, the combination with a press-box and a pitman provided with vertically-disposed trunnions, of a plunger having a pair of horizontal plates, one having an opening and the other a slot for the reception of the pitman-trunnions, whereby the attachment of the pitman to the plunger or its detachment therefrom is facilitated.

20. In a baling-press, the combination with a press-box and a plunger therein, of spring-plates extended forwardly from the plunger and engaging the walls of the press-box to retain said plunger in its proper position during the plunger-stroke.

21. In a baling-press, the combination with a press-box and a reach-casting secured thereto, of a plunger within the press-box, spring-plates carried by the plunger and engaging the side walls of the box, and a bar extending between the plates to brace the latter and disposed to rest upon the reach-casting to form a rest for the plunger when the latter is withdrawn from the box.

22. In a baling-press, the combination with a press-box, of a hollow transverse frame-bar disposed above the same, and a folder housed within said bar.

23. In a baling-press, the combination with a press-box, a hollow transverse frame-bar disposed above the same, an axle located below the press-box, hooked bolts engaging the axle and frame-bar respectively and located at opposite sides of the box, and a folder housed in the transverse frame-bar.

24. In a baling-press, the combination with a press-box, of a folder disposed transversely thereof, a transverse frame-bar disposed above the box in position to protect the folder, an axle located below the press-box, and means connecting the transverse frame-bar and the axle.

25. In a baling-press, the combination with a frame structure, including a press-box, a supporting-casting, and an intermediate reach, of a front truck having swiveled connection with the supporting-casting, a driving-arm mounted to swing from the casting, a rotary head cooperating with the driving-arm, and a plunger operated by said arm, the connection between the casting and the truck including a stud formed integral with one member and rotatably received by a socket in the other, and the connection between the driving-arm and the casting like-

wise including a stud formed integral with one element and rotatably received by a socket formed in the other element.

26. In a baling - press, the combination with a press-box, a plunger, and a pitman, of an oscillatory driving-arm connected at a point intermediate of its ends to the pitman, and a head arranged to engage the driving-arm and to move along the latter from the inner to the outer side of the pitman, connection to compound the leverage.

27. A single-piece supporting-casting for the power mechanism of presses, including the following features: to wit, a vertical socket, an arcuate flange concentric therewith at the lower edge of the casting, a vertical lug and a socket member extended above the main portion of the casting, said socket member having a socket, and a reach-socket extended laterally from the main body of the casting.

28. A single-piece supporting-casting for the power mechanism of presses, including the following features: to wit, a vertical socket, an arcuate flange concentric therewith at the lower edge of the casting, a pair of vertical lugs and a socket member extended above the main portion of the casting, said socket member having a socket, and a reach-socket extended from the body portion of the casting.

29. In a baling - press, the combination with a press-box and plunger, of plunger-operating mechanism including a rotary head cast in a single piece with right-angular drop-flanges at its opposite ends, the horizontal portions of the flanges extending inwardly toward the axis of the head from the vertical portions of the flanges, rollers carried by the head and located between the under side of the body portion thereof and the horizontal portions of the drop-flanges, and a driving-arm disposed to be engaged by the rollers said rollers having an orbital travel outside of or beyond the driving-arm.

30. In a baling - press, the combination with a press-box, and a hopper located above the same and open at one end, of a transverse frame-bar disposed above the press-box and across the open end of the hopper, means for rigidly connecting said frame - bar to the opposite side walls of the hopper to prevent spreading thereof, an axle located below the press-box, and bolts connecting the ends of the transverse frame-bar with the axle.

31. In a baling - press, the combination with a press-box and a supporting member having a reach-socket at its rear end, of a reach extended from the press-box and having its front end retained in the reach-socket, a truck carrying the supporting member and having swiveled connection therewith, a plunger in the press-box, a pitman connected thereto, and plunger-operating mechanism, said operating mechanism including a driving - arm and a cooperating sweep both mounted on the supporting member independently of the truck connection.

32. In a baling - press, the combination with a press-box, a reach extended therefrom, and a truck, of a supporting member directly and detachably connected to both the reach and truck, a plunger in the press-box, a pitman connected to the plunger, and plunger-operating mechanism mounted directly and exclusively on the supporting member and independently of both the reach and truck connections, whereby the supporting member and the plunger-operating mechanism may be detached as a unit from the truck and reach without disturbing the mounting of said operating mechanism.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HILLYARD A. STARR.

Witnesses:

E. H. SPENCER,
ROY C. SMITH.